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1990

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Citation of this paper:

Laidler, David. "Was Wicksell A Quantity Theorist?." Department of Economics Research Reports, 9009. London, ON: Department of Economics, University of Western Ontario (1990).

25024

ISSN:0318-725X
ISBN:0-7714-1219-3

RESEARCH REPORT 9009

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August 1990

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by

David Laidler

*Paper presented at a conference in honour of Don Patinkin, held in Jerusalem, May 1990. I am grateful to Arie Arnon, Haim Barkai, Peter Howitt, Lars Jonung and Don Patinkin for comments, Tony Bernardo and Horst Raff for research assistance, and to the SSHRCC for financial support.

INTRODUCTION

Knut Wicksell's work was seminal to intellectual developments that, later in the century, were to discredit the quantity theory of money among the majority of academic economists. The dynamic economics of the Stockholm School started from Wicksell's analysis of inflation as a cumulative process; so did the Austrian business cycle theory of Ludwig von Mises, Friedrich von Hayek and Lionel Robbins; and Keynes's *Treatise on Money* betrays an explicitly acknowledged Wicksellian influence, which also marks the *General Theory*. And yet Wicksell himself, in Bertil Ohlin's (1936) words, " . . . always insisted that this reasoning [the cumulative process model of inflation] did not mean more than an amplification of the old quantity theory." (p. viii) Furthermore, the amplified version of the quantity theory which Wicksell developed differs at first sight only slightly from, say, Marshall's; but if we view it with hindsight informed by knowledge of the abovementioned subsequent developments in monetary economics, the differences between Wicksell and his contemporaries turn out to be more important.

Three readily accessible accounts by Wicksell of his monetary thought are available in English. Of these, two are comprehensive, namely *Interest and Prices* (1898, tr. 1936, henceforth *IP*) and *Lectures on Political Economy Vol. II* (1906, revised ed. 1915 tr. 1935, henceforth *L*), and form the major sources for this essay.[1] The two works differ in that the earlier one is a monograph largely devoted to setting out Wicksell's own ideas, while the latter expounds those ideas in the course of a more general survey of monetary economics. The fact that the analysis of *Interest and Prices* is more detailed and precise than that of the later work is surely explained by this fact, for there is no essential difference between the *theoretical* content of the two books. When it comes to claims about the *empirical* relevance of that theoretical content, however, those made in the *Lectures* are a little more modest, and, I shall argue, some at least of the ambiguity of Wicksell's attitude to the Quantity Theory stems from this shift in his views about its empirical content. In (1915) he was more favourably disposed to that doctrine than he had been in 1898.

COST OF PRODUCTION AND THE QUANTITY THEORY

Classical monetary economics had simultaneously adhered to two different theories of the value of money, namely the quantity theory and the cost of production theory of value. In the English tradition of Senior (1840) and Mill (1871) these had been treated as complements, the former relevant to the short run, and the latter to the long run. Even so, there was a certain tension inherent in the monetary theory which Wicksell inherited that stemmed from this source. Moreover, he was working in a German language tradition into which Marxian ideas had made considerable inroads, and so he took seriously those who treated the two approaches as alternatives, going out of his way to attack[2]

> ". . .Karl Marx and his school who generally carry the classical theory of value to its extreme, and consequently to the point of absurdity, [and who] adhere to the cost of production theory as a simple and tangible explanation of the value of money and oppose it to the Quantity Theory . . ." (*L* p. 147)

Chapter 4 of *Interest and Prices* bears the title "The So–called Cost of Production of Money" and begins with the following (implicitly anti–marxian) assertion:

> "No theorist can to–day lend his support to the traditional conception that money possesses in itself an independent, and more or less invariable, intrinsic value, against which the exchange values of real commodities are, as it were, compared or measured . . . the modern theory of value must have put a definite end to this approach. . ." (*IP* p. 29)

Though Wicksell was willing to concede the logical possibility implicit in the abovementioned "modern theory of value" that the purchasing power of a commodity money might be given exogenously to the monetary sector because it was ". . .determined more or less completely, through the influence of other markets in which it appears as a commodity proper"

(*IP* p. 29) he immediately went on to deny the contemporary empirical relevance of this possibility.[3]

> "But the case is a different one where the employment of the money commodity as an article of use, and particularly its *actual* consumption . . . have come to occupy a position altogether secondary to its employment as a medium of exchange, and where, in addition, the yearly production results only in a relatively slow increase in monetary stocks. Such is the case with the precious metals standard of today, and with the instruments of exchange that are based upon it." (*IP* p. 30, Wicksell's italics)

Here, and in parallel passages in the *Lectures* (pp. 146–153), he cites Senior's (1840) account of the cost of production theory of the price level as the basis of his argument that changes in the cost of production of the precious metals will, under such circumstances, influence the price level only to the extent that they lead to changes in the quantity of money. Furthermore, he notes that to introduce the more precise concept of marginal production cost into the analysis forces one to the conclusion that it, and the value of money, are simultaneously determined endogenous variables, making it impossible to argue that one variable determines the other. The upshot is that

> "The cost of production theory is thus fully justified as constituting *an element* in the Quantity Theory. But only one element. Since the annual production of gold, even in the most favourable circumstances, can only increase the existing stocks of gold coin by a few per cent, changes in output will only gradually, and as a rule very slowly, exert their influence. . ." (*L* p. 149, Wicksell's italics)

As a practical matter,

> ". . .it is precisely changes in prices and fluctuations in the value of money over relatively *short* periods – ten, fifteen, or twenty years – which have the most serious consequences for trade. The more gradual changes. . .are of far less importance . . . it is just when enlightenment is most urgently needed that this [cost of production] theory leaves us sadly in the lurch." (*IP* p. 33, Wicksell's italics)

Nor was Wicksell any kinder to other alternatives to the quantity theory proposed by his contemporaries. He had no time for the ideas of J. Lawrence Laughlin (eg. 1903), and in particular his attempt to derive a general theory of the value of money from the value of the precious metals in non–monetary uses. Laughlin went so far as to extend this theory to the case of inconvertible money by relating its current purchasing power to ". . . the hope of the future convertibility of the notes into metal." (*L* p. 151) Here Wicksell argued that expected appreciation of paper would reduce its quantity *in circulation* and influence the current price level via this route. What we would now call the "backing" theory of the value of money was thus treated as encompassed by the quantity theory. As to the Austrian idea, nowadays usually associated with von Mises, that

> ". . . it is the image of the actual metallic currency into which the notes were at one time convertible before they were declared legal tender which remains in the mind of the public and thereby to some extent maintains the value of the notes. . ." (*L* p. 151)

it was placed, along with Laughlin's analysis, in the category of "most perverse and fantastic explanations".[4] (*L* p. 151)

For Wicksell, then,

> "The only specific theory of the value of money which has been propounded, and perhaps the only one which can make any claim to real scientific importance, is the Quantity Theory, according to which the value or purchasing power of money varies in inverse proportion to its quantity. . ." (*L* p. 141)

But in conceding "scientific importance" to the quantity theory, Wicksell certainly did not also signify wholehearted acceptance of any version of the doctrine. The quantity theory, as he understood it, might provide ". . . a real explanation of its subject matter . . . but only on assumptions that unfortunately have little relation to practice, and in some respects none whatsoever." (*IP* p. 41) Wicksell identified two problems with the theory in question. First, there was the matter of its all important *ceteris paribus* clause which held equal ". . .some of the flimsiest and most intangible factors in the whole of economics – in particular the velocity of circulation of money . . ." (*IP*. p. 42) Second, there was the question of the transmission mechanism.

> "That a large and a small quantity of money *can* serve the same purposes of turnover if commodity prices rise or fall proportionately to the quantity is one thing. It is another thing to show why such a change of price must always follow a change in the quantity of money and to describe what happens." (*L* p. 160)

Because Wicksell was conscious of ". . .the folly of supposing that circumstances in which . . . there is an essential relation between two things – goods and money – can ever be satisfactorily explained from the point of view of . . . only one of them. . ." (*L* p. 151), he saw that

> "A general rise in prices is. . .only conceivable on the supposition that the general demand has for some reason become, or is expected to become, greater than the supply. This may sound paradoxical, because we have accustomed ourselves, with J. B. Say, to regard goods themselves as reciprocally constituting and limiting the demand for each other. And indeed *ultimately* they do so; here, however, we are concerned with precisely what occurs, *in the first place*, with the middle link in the final exchange of one good against another, which is formed by the demand of money for goods and the supply of goods against money." (*L* p. 159, Wicksell's italics)

As this quotation shows, Wicksell understood far more clearly than had Mill (1844), and indeed just as clearly as Patinkin (1956), that the "Classical Dichotomy" between theories of relative prices and the general price level could not be generally valid, and had to be abandoned if the causative mechanisms underlying the quantity theory were to be analysed.[5]

THE PURE CASH ECONOMY

No modern exponent of the quantity theory can avoid the awkward question of how to specify empirically the "money stock" variable which is so central to that theory, but there is nothing new about this question. It puzzled monetary economists throughout the 19th century, because then, as now, the institutional framework of the financial sector was undergoing a process of constant development which clearly influenced the economy's exchange mechanisms.[6] Even as late as the turn of the century, the word "money" was normally used to refer to what we would now call "currency" –ie. notes and coin in circulation – and there was no consensus as to how to modify the quantity theory of money to accommodate the existence of deposit banks and the credit facilities which they made available to the business community.

Thus Fisher (1911) recognized that chequable deposits circulated just as surely as did notes and coin, and incorporated their quantity and velocity as separate variables in his formulation of the equation of exchange; while Cambridge economists in accordance with traditional usage, usually (not always, for the discussion in Pigou (1912) is something of an exception) focussed on the supply and demand for a stock of currency, and treated bank deposits as an alternative way of holding "titles to legal tender" (the phrase is taken from Pigou 1917), the existence of which would affect the demand for "legal tender", or currency, itself.

Wicksell took the same line as the Cambridge school. When he analysed what he termed "A Pure Cash Economy", by which he meant one completely devoid of credit relations, whether direct between buyers and seller, or indirect between the debtors and creditors of a banking system, he defined velocity as "the average number of times the available pieces of *money* change hands during the unit of time" (*IP* p. 52, my italics), thus treating "cash" and "money" as synonyms.[7] He maintained this usage when he extended his analysis to the cases of "Simple Credit" and "An Organized Credit Economy", remarking with respect to the theoretically limiting case of the latter, in which all transactions are effected through the transfer of bank deposits, that, in such circumstances, ". . .there is no real need for any money at all. . ." and that the banks ". . . would require *no stock of cash*" (*IP* p. 68, Wicksell's italics). These matters of usage are worth explicit attention for two reasons. First, and obviously, it is easy to misunderstand much of what Wicksell has to say about the quantity theory of *money* unless one bears in mind what he means by that word. Second, and far more important, Wicksell did not, as did Fisher, apply the concept of velocity to bank deposits. Hence, in the abovementioned limiting case of a "pure credit economy", the quantity theory of money was presented as irrelevant, rather than merely in need of modification to accommodate a different money concept. The point is semantic, as Patinkin (1965) has also noted, but, as we shall see, semantics affected the substance of Wicksell's analysis.

Before we discuss the pure credit economy case it will be helpful to deal with Wicksell's treatment of the quantity theory in the context of the opposite abstraction, namely

the above mentioned "pure cash economy", where his exposition was based on a version of the Cambridge cash–balance approach to the theory.[8] Here he began by noting ". . . that the purely physical conditions under which money can be paid and transported set a definite limit to the magnitude of the velocity of circulation" (*IP* p. 54), but only as a preliminary step to arguing that

> "[t]here is . . . an important factor which sets both upper and lower limits to the magnitude of the velocity of circulation. It is the time during which each piece of money has to lie unused in the till between two successive payments." (*IP* p. 55)

He made this "interval of rest" of money, which he explicitly characterized as "the reciprocal of [the] velocity of circulation" (*IP*. p 52) the centrepiece of his analysis, picturing it as depending upon three factors. The first of these boils down to what we would now call the "transactions motive". In general "technical and natural features" affect "the size of the cash holding" (*IP* p. 56) and in a cash economy ". . . the most essential cash holdings are those which are destined for definite payments at given points of time in the future" (*IP* p. 57). Wicksell then proceeded to discuss the influence on money holding of ". . .those more or less *unforeseen* disbursements which occur in every business." (*IP* p. 57, Wicksell's italics), and developed a simple analysis of what we would now term the "precautionary motive", based explicitly on an application of probability theory whose origins are acknowledge to lie in Edgeworth (1888).

> "Suppose that experience has shown that . . . the excess of payments over simultaneous receipts . . . tends to oscillate from year to year about a certain mean value, *a*. Let the "probable deviation' be *b*: this means that the odds are even . . . in favour of

> payments . . . over the period . . . lying between $a + b$ and $a - b$. If the business man is satisfied with this so–called simple margin of safety, he must have by him a cash holding of $a + b$. . . .With a cash holding of as little as $a + 2b$, the betting on the total exhaustion of his till over the period in question would, according to the laws of probability, be more than 9 to 1; with a cash holding of $a + 3b$ it would be more than 44 to 1. . ." (*IP*. pp. 57–58)

Though Wicksell conceded that "[t]he business man has never heard of the Calculus of Probability", he also argued that "his empirical line of reasoning" would lead him to maintain precautionary money holdings whose ". . .stability becomes even more marked when it is the average of all businesses in a particular field that is under consideration" (*IP*. p. 58).

Wicksell's third factor influencing money's average interval of rest in a cash economy was not, of course, akin to the Keynesian "speculative motive", because there are no bonds in such an economy; but it did involve the temporary holding by the wealthy of ". . .considerable sums of money [which] accumulate from time to time . . . as a result of the sale of individual blocks of capital or the like. . ." (*IP*. p. 58), and it was likely to introduce an element of instability to velocity. However he paid only passing attention to this possibility, concluding that, in the pure cash economy, ". . . the average interval of rest, and consequently the average velocity of circulation of money, is of almost constant magnitude" (*IP* p. 59)

The details of Wicksell's theorising about the demand for money in some respects went deeper than those of his contemporaries. Even so, the theorising in question yielded nothing new in the way of predictions about the behaviour of velocity, which, in a cash economy at least, would be "almost constant". Nor did Wicksell add anything to the analysis of the transmission mechanism in such an economy. We might admire the clarity of the following exposition of cash balance mechanics, particularly given its date of composition, but there is

nothing of substance in it that cannot also be found in the works of, say, Fisher and the Cambridge School.

> "Now let us suppose that for some reason or other commodity prices rise while the stock of money remains unchanged, or that the stock of money is diminished while prices remain temporarily unchanged. The cash balances will gradually appear *to be too small in relation to the new level of prices*. . . I therefore seek to enlarge my balance. This can only be done. . . through a *reduction* in my *demand* for goods and services, or through an *increase* in the *supply* of my own . . . or through both together. The same is true of all other owners and consumers of commodities. But in fact nobody will succeed in realizing the object at which each is aiming – to increase his cash balance; for the sum of individual cash balances is limited by the amount of the available stock of money, or rather is identical with it. On the other hand, the universal reduction in demand and increase in supply of commodities will necessarily bring about a continuous fall in all prices. This can only cease when prices have fallen to the level at which the cash balances are regarded as *adequate*. (In the first case prices will now have fallen to their original level.) (*IP* pp. 39–40, Wicksell's italics)

If Wicksell had done no more than analyse the quantity theory of money in the cash economy case, he would now be remembered, if at all, not as an original thinker, but as a capable expositor of conventional ideas. However he dealt with this case not as an end in itself, but simply as a starting point for his treatment of an economy characterised by highly developed credit institutions. This matter had of course occupied every monetary economist

from Adam Smith onwards, not least Wicksell's contemporaries in England and the United States, but none of them dealt with it with the depth and care which marked his work, as we shall now see.

CREDIT AND THE VELOCITY OF MONEY

Like any other quantity theorist, Wicksell understood that "[e]very change in the normal velocity of circulation of money must . . . be regarded as acting in the same way. . ." on prices as ". . .a change in the actual amount of money . . ." (*L*. p. 168), and when he introduced credit into the picture, variations in velocity replaced variations in the quantity of money as the main source of price level fluctuations. For him credit was ". . .the great and principle agent in accelerating or retarding the velocity of circulation. . ." (*L* p. 169), whether it was "simple credit", essentially trade credit arrangements between agents with ongoing commercial relations, or "organised credit" involving the operations of commercial banks. The former would enable agents to dispense with money held for financing regular and foreseen transactions (cf. *IP* p. 57) but its effects were not nearly as significant as those of organised credit. The existence of a banking system gave agents another opportunity to dispense with transactions balances, and also enabled them to avoid temporarily holding large blocks of wealth in the form of money. Indeed, it reduced the significance of any kind of money holding because it also facilitated the reduction of precautionary balances. This latter effect was partly due to ". . .the regularity of chance, the "Law of Large Numbers", but still more to the real interdependence of firms, a payment by one firm resulting, directly and indirectly, in a corresponding receipt by another" (*IP* p. 66), and its result was that

> "The greater the number of the bank's customers, and the more diverse their occupations and their positions in life, the smaller is the stock of cash which the bank has to maintain in relation to the

> total extent of its business; and the greater *pro tanto* is the velocity of circulation of money." (*IP* p. 68)

In the limiting case ". . .all payments could be effected by . . .bookkeeping transfers, except possible those for which small change suffices" (*IP* p. 68), so that "[i]n a developed credit economy. . .the velocity of circulation is *capable* of being increased more or less at will." (*IP* p. 62, Wicksell's italics)

The italicisation of the word "capable" here is important. The accounts which Wicksell gave of the workings of "a developed credit economy", both in *Interest and Prices* and the *Lectures. . .*, show that he sometimes thought in terms of an economy in which bank credit completely replaced what he called money, and that he also treated this case as a practical possibility for the future. However, they also attest to his understanding, stressed by Patinkin (1965) that

> ". . .a state of affairs in which money does not actually circulate at all, neither in the form of coin (except perhaps as small change) nor in the form of notes, but where all domestic payments are effected by means of the *Giro* system and bookkeeping transfers" (*IP* p. 70)

did not adequately describe the pre–first–world–war monetary system which he was at pains to understand. He referred the pure credit economy as a ". . .purely imaginary case. . . a precise antithesis to the equally imaginary case of a pure cash system. . ." and characterised "[t]he monetary systems actually employed in various countries . . . as *combinations* of these two extreme types." (*IP* p. 70, Wicksell's italics) However, Wicksell went on to argue,

> "[i]f we can obtain a clear picture of the causes responsible for the value of money in *both* these imaginary cases, we shall. . . have found the right key to a solution of the complications which monetary phenomena exhibit in practice." (*IP* pp. 70–71)

Hence he treated the pure credit economy case in even more detail than its antithesis. But in this case the Quantity Theory was rendered irrelevant by the complete absence of "money" from the economy. And, though the roots of this view of Wicksell's lie in semantics, it also has real theoretical consequences, because he never applied to bank liabilities the same theory of the demand for money that he had developed for cash. Hence the demand for bank deposits has no behavioural significance in Wicksell's analysis of the credit economy.

THE CREDIT ECONOMY

Wicksell's understanding of the limits to the validity of Say's Law in a monetary economy was exceptionally clear. He saw that, if prices in general were to change, it must be as a consequence of an excess demand or supply of goods in general, and that in the cash economy case, this required that an excess supply or demand for money set in motion conventional cash balance mechanics. In a pure credit economy devoid of money, however, this cannot work. Some other channel of causation is required to change the nominal prices of goods, and Wicksell sought and found it in an interest rate mechanism. He was well aware that he was by no means the first economist to analyse the interaction of interest rates and prices. Extensive passages in *Interest and Prices*, and the *Lectures*. . . deal with the treatment of this matter by English Classical economists, notably Ricardo and Tooke.[9] Moreover, Wicksell was familiar with Marshall's (1889 reprinted 1926) evidence to the Gold and Silver Commission, of which Keynes (1925) thought so highly, on the role of the interest rate in the "transmission mechanism"; and he also knew Irving Fisher's (1896) analysis of the influence of expected inflation on nominal interest rates. Nevertheless, it was his knowledge of the capital theory of Jevons and Boehm–Bawerk, to whose development he was himself a major contributor, which prompted him to say new and important, though not always entirely satisfactory, things about these matters.[10]

The heart of Wicksell's contribution lies in his distinction between the *market* or *money* rate of interest, that charged by banks on their loans to customers, and the *real* or *natural* rate of interest, which he defined in a variety of ways. In *Interest and Prices* he characterised it as follows:

> "There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them. This is necessarily the same as the rate of interest which would be determined by supply and demand if no use were made of money and all lending were in the form of real capital goods." (*IP* p. 102)

In the *Lectures*. . . we find this definition:

> "The rate of interest at which *the demand for loan capital and the supply of savings* exactly agree, and which more or less corresponds to the expected yield on the newly created capital, will then be the normal or natural real rate" (*L* p. 193, Wicksell's italics)

And in the (1907) *Economic Journal* we are told that ". . .the profit on capital . . . is determined by the productivity and relative abundance of real capital, or in the terms of modern political economy, by its *marginal productivity*" (1907 p. 214 Wicksell's italics)

Even if we set aside the by now well understood problems of relating an economy wide rate of profit or interest to the marginal product of some aggregate called "capital", and Wicksell was well aware of these, there are still difficulties here.[11] Why should flows of saving and investment just be equal at a rate of interest equal to the marginal product of capital per unit of capital? Why should that value of the rate of interest which equates savings and investment in a barter economy also do so in a money economy? And will prices be

constant if banks charge this rate for loans, regardless of the pace at which the economy is growing? Wicksell never discussed these questions explicitly, and in his most careful analysis of the interaction of the market and natural rates of interest, that contained in Chapter 9 (Systematic Exposition of the Theory) of *Interest and Prices*, he made precisely the right set of assumptions to render his potentially incompatible definitions of the natural rate of interest equivalent to one another, (and to give the marginal productivity per unit of capital the dimension of a pure rate of flow per unit of time into the bargain!) He also claimed, however, that those assumptions were ". . .made purely for the sake of simplicity and clarity; not a single one of them is essential to the validity of the general conclusion." (*IP* p. 136)[12]

Wicksell explicitly told readers of *Interest and Prices* that they could safely omit the abovementioned Chapter 9 (cf. *IP* p. 121), but though it is more difficult than the rest of the book, this chapter also displays more clearly than any other source both the depth of, and limits to, Wicksell's understanding of the interaction of interest rates and the price level, not least the extent to which his notion of the natural rate of interest derives from the capital theory of Jevons and the Austrians (cf. pp. 122–134). Moreover, and precisely because its analysis is presented in terms of an explicit model, a modern reader will feel more comfortable with it than other accounts, which are unacceptably loose by present day standards (which were *not* however, those ruling at the turn of the century).[13]

Wicksell's model economy is inhabited by no fewer than four types of agent: entrepreneurs who hire labour and fixed capital (including land) to produce output; the owners of those inputs, henceforth subsumed under the label workers; banks, which borrow from capitalists and lend to entrepreneurs; and the just mentioned capitalists, who in addition act as middlemen in the output market, buying goods from entrepreneurs and selling them to workers. Furthermore

> ". . . capital goods which have been invested for a long time ('rent earning goods') are subject to no other change than the repairs . . . necessary for their maintenance . . . liquid real capital which has to be renewed year by year is maintained by the capitalists at a constant amount. . . the length of the period of production is the same in every business, and amounts to one year. . . production begins everywhere at the same moment of time . . . and . . . the final product, the consumption goods, are not completed or available for exchange until the end of the year." (*IP* p. 136)

The assumption of zero capital accumulation here disposes of those problems, alluded to earlier, having to do with the maintenance of simultaneous stock and flow equilibrium in the capital market, and as we shall see in a moment, it also helps to ensure that zero nominal credit expansion on the part of the banks will produce a constant price level. Moreover, the assumption of a uniform period of production for all types of consumption goods, which also form the stock of liquid capital, eliminates that dependence of the structure of relative prices on the rate of interest which lies at the heart of the difficulties, also alluded to above, of constructing an index that simultaneously measures capital and its marginal product.[14]

To complete Wicksell's scheme, it is only necessary to specify the timing of transactions over the period of production. The typical year begins with *last* year's output in the hands of capitalists, and entrepreneurs making their plans for *this* year's activities. The latter decide upon their nominal expenditure on inputs, and take interest bearing loans from the banks to finance it. Workers (and other inputs) are hired for the year, paid in advance, and immediately purchase from the capitalists the stock of consumption goods which will support them during the period of production. Production then begins with entrepreneurs indebted to the banks, and capitalists holding the matching (and interest bearing) liabilities. At the end of

the period, output is realised in an amount equal to the initial stock of circulating capital plus profits. This is sold to capitalists in exchange for their bank liabilities, gross of interest, which sum is just sufficient to enable entrepreneurs to pay off their loans, including interest charges, to the bank. Capitalists take, for their own consumption, goods equal in value to their interest income, and hold the remainder in anticipation of their sale at the beginning of the next period. Clearly, this scenario leaves entrepreneurs and banks with zero incomes, but, equally clearly, nothing essential to the model hinges upon this assumption, and Wicksell did in fact soften it in the course of his exposition. (cf. *IP* p.140).

Wicksell sets his economy going on the assumption that the "contractual rate of interest" (*IP* p. 139) which the banks charge entrepreneurs is equal to the natural rate (the ratio of the difference between output and the stock of circulating capital to that stock). A modern economist, versed in the mechanics of rational expectations modelling, would conclude that in such circumstances the price level is indeterminate.[15] The nominal amount which the representative entrepreneur is willing to borrow to finance production will depend upon the revenue expected to be realised from the sale of output at the end of the period; but the model's structure ensures that the latter sum will be equal to the former, plus interest. Any agent understanding the model's structure will, then, also understand that any volume of nominal borrowing, and therefore any price level, is sustainable. This, however, was *not* Wicksell's conclusion. Though he understood perfectly well that the borrowing decision depended upon expectations about output price, he anchored the relevant expectations in experience, and assumed that ". . . entrepreneurs are not reckoning. . . on any future rise in prices". (*IP* p. 144)

As Ohlin (1936 p.xii) noted, "The assertion that business calculations are as a rule made on the basis of current prices would not have withstood much criticism", but this was always (though often implicitly) Wicksell's assumption when he discussed situations in which the market and natural rates of interest were equal. Moreover, he usually maintained it when

he analysed the early stages of the economy's reaction to a discrepancy between the two rates as well. The effect of this assumption was, of course, to select a unique value for entrepreneurs' expected nominal receipts, and to ensure that the volume of nominal borrowing, and hence the price level, would remain constant over time so long as the market and natural rates of interest remained equal to one another. But Wicksell was concerned with the consequences for the price level of a discrepancy arising between the two rates, and in Chapter 9 of *Interest and Prices* he introduced it by postulating an increase in the natural rate of interest. He noted that "[i]n the first place [the gain from this increase] accrues to the entrepreneurs." (*IP* p. 141) With nothing else changed, all of the transactions that have previously gone through can still be completed, with the extra output implied by an increase in the yield of a (by assumption) given capital stock remaining for entrepreneurs' own consumption. Since this gain in consumption, however, is proportional to the scale of production, each entrepreneur now has an incentive to expand operations, and hence to increase borrowing from the banks in order to bid for extra inputs. In Wicksell's words,

> "If entrepreneurs continue, year after year perhaps, to realise some surplus profit of this kind, the result can only be to set up a tendency for an expansion of their activities. I emphasise . . . that . . . it is purely a question of a *tendency*. An *actual* expansion of production is quite impossible, for it would necessitate an increase in the supply of real factors of production. . . The *tendency* towards an expansion of output. . . brings about an increase in the demand for labour and other factors of production . . . Money wages and money rents are forced up, and although there is no general expansion in production, entrepreneurs are obliged to borrow more capital from the banks for the production of the current year." (*IP* pp. 143–144, Wicksell's italics)

As before, a modern economist will recognise an essential indeterminacy in the process under analysis, stemming this time from the fundamental disequilibrium forced upon this economy by the discrepancy between the natural and money rates of interest; but though Wicksell conceded that "It is impossible to tell directly how much wages will go up, and therefore by how much industrial capital has to be increased" he argued that ". . .on our assumption it is possible to fix a limit." It is not clear just which "assumption" is being referred to here, but two seem to be required to reach the same conclusion as Wicksell. The first is made explicitly – ". . . entrepreneurs are not reckoning for the moment on any rise in prices. . ." (*IP* p. 144). The second is not, but appears to be that each entrepreneur expects to command just the same real amount of inputs as before after bidding for them is done. In these circumstances, entrepreneurs would be willing to add to their nominal factor payments no more than the current value of the windfall in consumption goods that the increase in the natural rate of interest has made available, or, in Wicksell's words, ". . .the upper limit to the possible rise in wages is the fall [sic] in the rate of interest."[16] (*IP* p. 144)

Wicksell then goes on to show that, because increased nominal payments to inputs find their way into the hands of capitalists in exchange for the stock of consumption goods produced last period, and because the market interest rate which entrepreneurs pay and capitalists receive is still below the natural rate, the former are, at the end of the period, able to sell the same quantity of goods to the latter as they did previously, but at a higher price. He also shows that this higher price enables them to meet their higher nominal indebtedness without being forced to sell the extra output conferred upon them by the higher natural rate of interest. Hence, the incentives that led to credit expansion and inflation in the first place remain exactly as they did at the outset, and the process repeats itself period after period for as long as the discrepancy between natural and market interest rates persists. Indeed, inflation may accelerate as entrepreneurs come to expect output prices to rise and take account of this in their borrowing decisions

> "It is possible in this way to picture a steady, and more or less uniform, rise in all wages, rents, and prices (as expressed in money). But once the entrepreneurs begin to rely upon this process continuing – as soon, that is to say, as they start reckoning on a future rise in prices – the actual rise will become more and more rapid. In the extreme case in which the expected rise in prices is each time *fully* discounted, the annual rise in prices will be indefinitely great" (*IP* p. 148, Wicksell's italics)

Wicksell's flirtation in the last sentence of this passage with rational expectations is not the only one to occur in his writings, but neither here nor anywhere else does he make anything of the idea. Backward looking, and indeed static, expectations were enough to generate an ongoing inflationary process in his analysis, and he usually stuck with these postulates.[17]

THE CUMULATIVE PROCESS

Now the model which Wicksell analyses in Chapter 9 of *Interest and Prices* with, by the standards of his time, such extraordinary care, is of a pure credit economy. As we have seen, he regarded such analysis, not as an end in itself, but as a step to understanding a real world in which both money and credit had roles to play. Moreover, though price changes cumulate over time in the pure credit economy, the inflationary mechanism at work there does not, as Patinkin (1965) has stressed, in and of itself, constitute the "cumulative process" which we associate with Wicksell's name. Rather it is one component of that process. The key insight yielded by Wicksell's analysis is that, in the words of his (1907) *Economic Journal* article,

> "If, other things remaining the same, all the leading banks of the world were to lower their rate of interest, say 1 per cent below its ordinary level, and keep it so for some years, then the prices of all

> commodities would rise and rise and rise without any limit whatever. . ." (p. 213)

The prediction here is a conditional one, and in the world to which Wicksell wished to apply his analysis, the conditions in question could not be fully met. The economy of that world was (in Wicksell's sense of the word) a "money" using economy, and under the gold standard, a commodity money at that. As a matter of fact then,

> ". . .under actual conditions there is a considerable quantity of coin in circulation – or of notes, which under the banking laws of many countries comes to the same thing. . . . A rise in prices exerts its influence, not only on the relation between the production and consumption of gold, but to a much more important extent on the demands of the monetary circulation. The quantity of coins and notes circulating in the hands of the public is usually much larger than the available reserves of the banks. It follows that quite a small rise in prices may bring about a very significant contraction of the banks' reserves." (*IP* pp. 113–114)

In turn this drain of reserves will induce the banks to raise their lending rate of interest so that "[i]t is thus confidently to be expected that. . . the money rate of interest . . . will always coincide *eventually* with the natural capital rate . . ." (*IP* p. 117, Wicksell's italics). Thus, for Wicksell, a discrepancy between the natural and money rates of interest sets in motion a "cumulative process" in which *rising prices induce a tendency for the discrepancy in question to be closed by a rising money rate of interest.*

Now modern economists, equipped with the notions of a stable reserve deposit ratio for the banks, and a stable currency deposit ratio for the non–bank public, (both of which ideas, it is worth noting, are to be found in Fisher's *Purchasing Power of Money*) are inclined to see Wicksell's analysis of the cumulative process as being, first and foremost, a useful elaboration

the mechanisms whereby an influx of the money commodity, whether from newly discovered mines in the case of the world economy, or through the balance of payments in the case of a single open economy, would lead on to a new, higher, and *stable*, equilibrium price level by way of a temporary disturbance to the money rate of interest. That, however, is not how Wicksell saw it. He was well aware of the possibilities of this line of reasoning from his studies of the Classical literature, and from Marshall's evidence to the Gold and Silver Commission, but he asserted that ". . .Marshall seems to me to lay too much emphasis on the *direct* influence that he alleges is exerted by the magnitude of banking reserves on the rate of interest and consequently on prices" (*IP* p.76, Wicksell's italics).

When Wicksell wrote *Interest and Prices*, it was his view that the typical disturbance arose in the real economy, not in the monetary sector. The quotation used above to illustrate his account of the role of a rising money rate of interest in bringing the cumulative process to an end tells us that ". . . the money rate of interest . . .will always coincide *eventually* with the natural capital rate. . ." but continues as follows " . . . or rather . . . it is *always tending to coincide with an ever–changing natural rate.*" (*IP* p. 117, my italics) Moreover, there is no sign in this book of a postulate that either the reserve deposit or currency deposit ratio is stable. In *Interest and Prices* Wicksell treated the concept of stable equilibrium, which is of course central to the quantity theory as it was (and indeed is) usually expounded, as being *almost* irrelevant to the analysis of price level behaviour once the pure cash economy assumption was abandoned. He is worth quoting at some length on this point.[18]

> ". . .the movement and equilibrium of actual money prices represent a fundamentally different phenomenon, above all in a fully developed credit system, from those of *relative* prices. The latter might perhaps be compared with a mechanical system which satisfies the conditions of *stable* equilibrium, for instance a pendulum. Every movement away from the position of

> equilibrium sets forces into operation – on a scale that increases with the extent of the movement – which tend to restore the system to its original position, and actually succeed in doing so, though some oscillations may intervene.
>
> The analogous picture for *money* prices should rather be some easily movable object, such as a cylinder, which rests on a horizontal plane in so–called *neutral* equilibrium. The plane is somewhat rough and a certain force is required to set the price–cylinder in motion and to keep it in motion. But so long as this force – the raising or lowering of the rate of interest – remains in operation, the cylinder continues to move in the same direction. Indeed it will, after a time, start "rolling": the motion is an accelerated one up to a certain point, and it continues for a time even when the force has ceased to operate. Once the cylinder has come to rest, there is no tendency for it to be restored to the original position. It simply remains where it is so long as no opposite forces come into operation to push it back.
>
> It is, of course, clear that such forces can never be entirely absent, no matter how developed the credit system may be, if a precious metal . . . serves as a monetary basis. The simple quantity theory is no longer adequate to deal with the nature of these reactions, and with the manner of the operation." (*IP* pp. 100–101 Wicksell's italics)

Wicksell's account of this matter appears essentially similar at first sight; but closer inspection reveals a subtle, and I believe important indifference of emphasis in the *Lectures*. The reader who turns to pp. 196–et seq. of that work will find an explicit reference to, followed by what amounts to a paraphrase of, the above discussion of stable and meta–stable

equilibria. Now, however, the latter concept is said to be relevant not ". . . *above all* in a fully developed credit system . . ."(*IP*. p. 100, my italics) but ". . . on the assumption of a monetary system of unlimited elasticity. . ." (*L* p. 197). There is no suggestion in this second case, as there is in the first that it might be relevant in less extreme cases too. Moreover, the paraphrase in question is followed by a passage which begins

> "This conclusion [about the meta–stability of equilibrium in a monetary system of unlimited elasticity] . . .is in full agreement with what would occur if prices rose in consequence of an actual superfluity of gold, if the new gold came into the hands of the public in the form of loans from the banks. . ." (*L* pp. 197–198)

The passage in question then goes on to describe precisely the transmission mechanism whereby such a price increase is brought about, which Marshall had sketched out in 1889, although it also warns the reader that

> "This [i.e. new gold coming into the hands of the public in the form of new loans from the banks] is certainly not usually the case, for gold flows into the country from abroad to some extent directly in payment for goods. In such a case it should immediately give rise to an increase in commodity prices, and this increase may even precede the arrival of the gold, so that in relation to the continually rising price level there may be no excess of gold and consequently no reason for lowering the rate of interest."
> (*L* p. 198)

Wicksell had, then, by 1915 become more ambivalent about the importance of money supply changes, as opposed to velocity shifts, as explanations of price level fluctuations, and also about the relevance of his cumulative process as a description of the transmission

mechanism whereby money supply changes, to the extent that they were important, had their effects. In 1898 he treated these matters as empirically irrelevant. By 1915 he seems less sure of this. As we shall now see the ambivalence in question arose from his beliefs about what empirical evidence had to say about these issues, and his views changed as that evidence accumulated.[19]

EMPIRICAL EVIDENCE

In *Interest and Prices*, Wicksell explicitly argued that the quantity theory was incompatible with empirical evidence:

> "It is impossible to conceive that a change in prices has no connection whatever with the situation in the money market. . . But the explanation suggested by the Quantity Theory – that rising prices are due to an excess of money, falling prices to a scarcity – does not accord with actually observed movements of the rate of interest. If it were correct, we should expect that at a time of rising prices there would be a temporary reduction in the rate of interest, at a time of falling prices a temporary increase; and that when prices had become accommodated to the change in the stocks of precious metal, the rate of interest would once again return to its normal position. Observation teaches us, however, that when prices are rising there is a continual *rise* in rates of interest, and that when prices are falling, there is a continual *fall* in rates of interest." (*IP* pp. 166–167, Wicksell's italics)

This passage occurs immediately *following* a discussion of Irving Fisher's celebrated (1896) study of *Appreciation and Interest*, where Fisher advanced what is nowadays regarded by the majority of economists as the correct explanation of the co–existence of rising prices with

rising interest, namely the influence (lagged in Fisher's view) of expected inflation on the *nominal* rate of interest. Wicksell, despite his acknowledgements elsewhere that agents might come to anticipate an ongoing inflation, rejected this explanation because its

> ". . . logical basis . . . is that entrepreneurs incur their "expense" . . . when things are cheap, and dispose of their product after prices have gone up. But it is then necessary to suppose that the rise in prices originates from some quite *independent* cause" (*IP* p. 166, Wicksell's italics)

This, of course, is a version of the objection, also advanced by Keynes in his (1911) review of *The Purchasing Power of Money*, to Fisher's analysis of the behaviour of nominal interest rates, namely that it is incomplete, in that it gives no account of the transmission mechanism by which an increase in the quantity of money *sets prices rising in the first place*. Wicksell's analysis *did* permit him to explain how this would come about, but in his model, as we have seen,

> ". . .a rise in prices. . .is usually due to a rise in the entrepreneurs' demand for labour and other productive services. Such a rise in prices is thus the consequence of a previous, no matter how far from uniform, rise in money wages and rents, and it merely serves to compensate the entrepreneurs for the rise in costs of production. It does not provide them with the means of paying a higher rate of interest – except in the case where the prevailing rate of interest is lower than the *natural rate*. . ." (*IP* p. 166)

Given the simplifying assumptions which Wicksell used in his Chapter 9 "Systematic Exposition. . .", notably those about the timing of productive activity and market transactions relative to a uniform period of production, which is also the period for which credit is granted,

this conclusion is correct. But if consumption goods are storable and credit available for more than one period, to suggest but one possible way of complicating his model, it is not; and if, in such a Wicksellian system, expectations are forward looking (a possibility which Marshall canvassed in his Gold and Silver Commission evidence, *Official Papers* p. 52) an increase in stocks of gold can simultaneously *raise* the nominal value of the market rate of interest and *lower* it relative to the (inflation adjusted) natural rate. The system envisaged here, though, *is* Wicksellian, *not* Wicksell's, and he *did* reject Fisher's analysis for inadequate reasons stemming from an overgeneralisation of the implications a very special theoretical structure. Instead of deploying the Fisher effect to explain the empirical relationship between price level and interest rate behaviour, then, Wicksell argued that

> "All these difficulties and complications at once disappear when it is changes, brought about by independent factors, in the *natural rate of interest on capital* that are regarded as the essential cause of such movements. These changes can be regarded as the cause, not only of the movement of prices, but indirectly of the analogous but somewhat later alteration in the money rate of interest. Abundance or scarcity of money. . . are to be regarded as consequences of changes in the demand for instruments of exchange brought about by changes in the level of prices . . .[H]owever . . . they *may* take their origin in independent causes . . . and that they then have an independent significance in regard to . . .prices, in so far as they accelerate or retard the movement of the money rate of interest to the new position of the natural rate. . ." (*IP* p. 167, Wicksell's italics)

Wicksell does here acknowledge the *logical* possibility of independent changes in the quantity of money having an effect on prices, but his subsequent interpretation of the history of price level behaviour in the 19th century accorded them little *practical* significance. Inflation during the Revolutionary and Napoleonic wars was due to upward pressure placed on the natural rate of interest by a war induced scarcity of capital; falling prices after 1815 arose from capital's relative post–war abundance. As to the ". . . upward movement of prices [which] started in the fifties. . ." and ". . .the gradual fall in prices. . . " which began in 1873 ". . .and has continued up to the present time. . . [t]he explanation seems to me completely analogous to that of the movement of prices in the years 1790–1815 and 1815–1850" (*IP* pp. 173–174). The Crimean War, the American Civil War, Germany's wars with Denmark, Austria, and France, the ". . .general progressive movement of industry" . . . and ". . .the freezing of enormous quantities of liquid capital as a result of the completion of the west European railway system" had all driven up the natural rate of interest after 1850. The ". . . large increase in the production of gold, and the issue of paper money in America, in Austria and finally in France. . ." might have been "partly" responsible for the failure of the money rate of interest to keep pace with the natural rate, but that was all. (cf.*IP* p. 171) As to the period after 1873, ". . . the economic depression which for more than twenty years has provided a constant source of complaint . . . must be regarded as the cause rather than the effect of the fall in prices." (*IP* p. 194)

The abovementioned account of the behaviour of prices during the 19th century shows that, in 1898, Wicksell rejected almost entirely the quantity theory explanation which Fisher, (following Jevons, whose interpretation of events Wicksell explicitly discussed and rejected) was later to advance in *The Purchasing Power of Money.*[20] For Wicksell, writing in 1898, the dominant factor at work in driving prices throughout the preceding century was not variations in the quantity of money. It was variations in the natural rate of interest; and price level

movements were *accommodated* either by fortuitous variations in the quantity of money, or, and mainly, by changes in its velocity associated with the failure of the banking system immediately and completely to adapt its lending rates to changed circumstances. In the *Lectures*. . . this stance is softened. Empirical evidence about the coexistence of rising prices with high interest rates is still taken seriously, and in the edition that was to be ultimately translated into English, is systematically presented in a chart covering the years 1850–1915. Moreover the evidence in question is still treated as problematic for the quantity theory (cf. *L* pp. 164–165, p.202, etc). There is no sign in the *Lectures*. . . of any acceptance of Fisher's (1896) analysis, this is simply ignored; while the less detailed account of the "cumulative process" given there generally pays less attention to endogenous inflation expectations than does that of *Interest and Prices*.[21]

Not surprisingly, then, variations in the natural rate of interest are still accorded an important role by Wicksell as independent impulses affecting prices, but now it is not all price level fluctuations which are explained in this way, but rather "[t]he fluctuations in commodity prices which are not directly caused by *changes in gold production*. . ." (*L* p. 205, Wicksell's italics). And, in non–gold producing countries, changes in gold production do not have to work on prices solely, or even mainly, through the banking system. They can influence the quantity of money directly through the balance of payments without the intervention of any fall in the money rate of interest. Moreover, the ". . . quantity of gold may in general have no influence on prices if the demand for money has simultaneously increased owing to the growth of population or to a more widespread social division of labour or a more extended use of money" (*L*. pp. 204–205) Though it is still problematic, the empirical association between rising prices and high interest is no longer presented by Wicksell in the *Lectures* . . . as it was in *Interest and Prices* as being *logically* incompatible with an explanation of price level behaviour that relies, in part at least, on variations in the quantity of money.

The source of Wicksell's shift towards an eclectic explanation of price level behaviour, which leaves room for quantity theory effects, between the publication of *Interest and Prices*

and the edition of the *Lectures*. . . which we have in English is not hard to track down. When the former work was published, the "great depression" of prices had just given way to inflation, but this fact was not then obvious. It was by 1915, as was its most probable cause, namely the gold discoveries made and quickly exploited in the Transvaal and the Yukon. Wicksell's comments on these discoveries, and their consequences are worth quoting at some length, for they show that he did indeed attribute the mild inflation that preceded the first–world–war to an increase in money, and not to an upward shift in the natural rate of interest.[22]

> "If the experience of the last seventy years does not seem to confirm this [the powerlessness of existing stocks of gold to buffer the price level against the impact of the discovery or exhaustion of gold fields] to the degree one might expect, it is due entirely to the fact that the great discoveries of gold and silver in the latter part of the nineteenth century occurred simultaneously with a great increase in population in most countries and a transition from trade in kind to trade in money. . . and, more important still, these discoveries were accompanied by the almost universal adoption of the gold or some cognate standard. . . These factors, however, are of a more or less accidental nature and their combination in the desired direction cannot always be counted upon, *as the much higher price level during the decade 1893–1913 clearly shows.*" (*L* p. 125, my italics)

WICKSELL'S LEGACY

As we noted at the outset of this chapter, Wicksell is usually portrayed as regarding himself as a (far from uncritical) exponent of the quantity theory of money. Even so, his work

was, in due course, to do more to undermine than strengthen the quantity theory's central position in monetary economics. The reasons for this lie in a combination of circumstances, some inherent in the work itself and some arising from developments in the real world economy.

All 19th century quantity theorists believed velocity changes, particularly those brought about by the secular evolution of the banking system, to be important for explaining variations in the the price level, and Wicksell recognised these effects too. But Wicksell went further than his contemporaries. He postulated that a modern banking system had capacity to render the velocity of currency a passive variable in the face of real shocks. This postulate underlay his idea that price level equilibrium was meta–stable, and led him to stress (even in the *Lectures*. . .) fluctuations in the natural rate of interest as the main factors causing the price level to fluctuate. Seen in the context of the monetary economics of the first decade or so of the twentieth century, this difference in emphasis between Wicksell and his contemporaries does not seem critical. The Cambridge School in particular would have found little difficulty in assimilating the idea that the velocity of currency might have a passive element to it, because, unlike Fisher, they did not attribute stability to reserve–deposit and currency–deposit ratios. Viewed with hindsight, however, the difference was important; and partly for no better reason than that Wicksell never extended his careful analysis of the motives which prompted the holding of currency in a pure cash economy into a parallel model of the demand for bank deposits in a pure credit economy.

The very precision with which he analysed the credit economy in Chapter 9 of *Interest and Prices* ruled this out. In the model developed there, a pure asset demand for bank deposits could not arise, since large capital items simply did not change hands. More crucially, and though Wicksell did not explicitly discuss matters in such terms, the pattern of payments and receipts which he imposed there led to a mechanically determined income velocity of deposits of one–per–period–of–production (and a transactions velocity of five). It left no room for

uncertainty about their timing, and hence precluded an associated precautionary demand for bank deposits. There is no logical reason why Wicksell could not have gone on, in less formal treatments, to note that any relaxation of his rigid assumptions would tend to give bank deposits the same role in the credit economy as currency in the cash economy; and then to note that deposits, generated as a by–product of credit creation, would have, by way of cash balance mechanics, their own influence on the economy over and above that stemming from direct credit market effects. He did not, however. Thus it came about that the monetary economics which Wicksell bequeathed to his Swedish successors lacked the notion that chequable bank deposits were a form of money whose velocity was susceptible to economic explanation.

Monetary economists working after the first–world–war built upon earlier ideas, but they were also deeply influenced by current events. The monetary upheavals associated with the war and its aftermath put an end, though not an immediate one, to the international gold standard. The pure credit economy case, which Wicksell had regarded as a theoretical abstraction (albeit one which might form the basis of a reformed monetary system at some future date), was a much more practical proposition by, say, 1920 than he could have imagined even five years earlier. Moreover, the main macroeconomic problems facing the post war economies of Western Europe were not mild medium term price level variations, such as had mainly concerned Wicksell. Violent cyclical fluctuations in both prices and real variables were the practical issues to be addressed. In the hands of the Stockholm school, there developed a body of dynamic macroeconomics, designed to elucidate the cycle, but until the mid–1930s concentrating on the cyclical behaviour of prices, which derived from Wicksell's analysis of the pure credit economy. As Myhrman (1987) has pointed out, however, the Stockholm School explicitly rejected as outmoded and irrelevant the quantity theory of money, which they identified with the stable velocity construction of Wicksell's pure cash economy special case, and they also followed Wicksell in failing to develop any theory of the demand

for bank deposits. Hence the monetary economics of the Stockholm School was quite devoid of a theory the role of money per se in the economy, and became identified with an extreme anti–quantity theory stance.

Now I am not here arguing that Wicksell himself accepted, or would have accepted, the way in which his work was subsequently to be developed by others.[23] However, I am arguing that his own attitude to the quantity theory had much to do with those developments. As I have tried to show, he regarded it as a genuine scientific doctrine, and superior to certain other theories of the price level. However, I have also shown that in (1898) he regarded it as empirically refuted by 19th century evidence; and though he did soften this stance in (1915) he did not then abandon also the theoretical position that the quantity theory was inherently irrelevant to the "pure credit" economy. As the monetary system of the real world evolved towards the latter, then, this aspect of Wicksell's analysis was bound to take on practical as well as theoretical significance.

And so, to conclude, let me briefly answer the question posed by the title of this paper: Was Wicksell a Quantity Theorist? — Only sometimes, and not when he was writing the contributions that, as it was to turn out, were to matter.

FOOTNOTES

[1]It is usual to date Volume 2 of Wicksell's *Lectures. . .* as 1906. This is indeed the date of publication of its first Swedish edition. However, Volume 2 as published in English translation in 1935 is not the first, but the *second* Swedish edition which dates from 1915. This edition incorporates material that could not have been in the first edition (eg. data on prices going down to 1913, Fig. 4, p. 202, references to Fisher's *Purchasing Power of Money* (1912) and his (1913) *Quarterly Journal of Economics* paper on "A Compensated Dollar", p. 128) and it would make an interesting study for someone who reads Swedish (which I do not) to see how extensive are other changes between these two editions. Nothing of substance in this essay, however, hinges on this question.

[2]And as Haim Barkai has pointed out to me, the influence of cost of production ideas went far beyond the Marxists in German economics and in fact dominated the thought of the Old Historical School. See Barkai (1989a) for a discussion of this matter. The you ger school, at least as represented by Schmoller was, perhaps, more eclectic, but still failed to take the quantity theory seriously. See Barkai (1989b).

[3]The question of the relative importance of the monetary sector as a source of demand for, and hence influence on the price of the precious metals, was important during the debate about bimetallism. Consistent with his empirical judgment that the demand for the precious metals qua money was dominant, Wicksell judged bimetallism to be a viable system, though by the time his commentary on this matter in the *Lectures. . .* was written, bimetallism was of mainly historical interest.

[4]Wicksell refers to and quotes Laughlin explicitly in the relevant section of the *Lectures*, but von Mises is not named as the originator of the idea we nowadays associate with him. The latter is left unattributed.

[5]As Patinkin (1965) stressed, the analysis of such mechanisms involves the existence of a disequilibrium inherent in which are equilibrating forces that come into play. A devotee of modern equilibrium macroeconomics in the style of Lucas (1972) would not regard the question of the limits on the validity of the classical dichotomy as interesting.

[6]And of course Thomas Tooke (eg 1844) paid particular attention to this question during the Currency School – Banking School debate. It is no accident that Wicksell's analysis of the role of banks led him to doubt the usefulness of the quantity theory in the presence of a well developed banking system, a position with strong Banking School overtones, because he was a careful and sympathetic reader of Tooke's work. For a modern account of Tooke's contribution, see Arnon (forthcoming).

[7]The choice of words here, is of course, that of Wicksell's translator Richard Kahn. Kahn's translation is, however, careful and accurate at this point. I am grateful to Mr. Horst Raff for guidance on this matter.

[8]Wicksell had read Marshall's Gold and Silver Commission evidence with considerable care, and we must not therefore treat him as an independent originator of this approach. In turn, it is presumably from his reading of Wicksell that Ludwig von Mises (1912) got the cash balance approach. Kirtzner (1987) errs in attributing originality to Mises on this matter.

[9]Wicksell was quite unaware of the contributions to this issue made by Henry Thornton (1802) when he wrote both of these books, though, according to Uhr (1960), later in his life Thornton's work was drawn to his attention.

[10]Wicksell's own contributions to capital theory are summarized in volume 1 of the *Lectures* (1905). Kompas (1989) contains a recent and most useful account of this aspect of his work.

[11]cf. (1905) pp. 202–203. See also Kompas (1989) Ch. 4.

[12]I suspect that this claim should not be taken at face value. The fact that Wicksell found just the right set of assumptions to rule out the problems in question in his most rigorous exposition of his theory, and the fact that his later discussions of the cumulative process both

in the *Lectures* and (1907b) are sufficiently vague to enable him to evade them, point rather to his knowing that a set of problems which he could not solve nevertheless existed. One way of reading the subsequent contributions of both Austrian business cycle theorists and the Stockholm School to monetary economics is as self–conscious attempts to solve these problems of wicksell's. On this see Laidler (1987).

[13]Patinkin (1965) apparently does not share my view of the importance of this particular chapter in *Interest and Prices* for a full understanding of Wicksell's views, and does not refer to it in detail. Note that in an earlier study of Wicksell (Laidler 1972) my account of the model set out in this chapter is not always clear, a matter on which Bailey (1976) comments helpfully.

[14]Wicksell was aware of the impossibility of constructing an aggregate measure of capital that does not depend on the structure of relative prices in a more general case than this, as Kompas (1989) has shown: hence, in part, my suspicion that his claims to be making only simplifying assumptions here are disingenuous. See fn. 12 above.

[15]See for example the analysis contained in Thomas Sargent's well known (1979) textbook. See also Cottrell (1989) and Howitt (1989) who argue, correctly in my view, that more than matters of semantics are at stake when modern economists attempt to force Wicksell's analysis into an equilibrium framework.

[16]Wicksell's statement here is sufficiently vague, and falls sufficiently short of precisely stating the interpretation which I put upon it that one is naturally led to wonder about the quality of the translation at this point. However Mr. Horst Raff has checked this matter, and assures me that Kahn's rendering is accurate.

[17]Consider for example Wicksell's ironic comparison of those who believe in the beneficial consequences of inflation with people who keep their watches running a little fast to be sure of never missing their trains. (*IP* p. 3). By and large, however, Wicksell pays less attention to endogenous, let alone rational, expectations in his later expositions of the cumulative process than in *Interest and Prices*. Indeed, in his (1907) *Economic Journal* piece,

which one might justly regard as expounded what he regarded as the essence of this analysis, the possibility that inflation expectations might be endogenous is never mentioned.

[18]Note that a state of affairs which, to Wicksell, produces a meta–stable equilibrium, generates in the context of a modern rational–expectations equilibrium model an indeterminate price level. cf pp. 000 above, and fn. 17. The difference here of course arises from Wicksell having assumed static expectations about the level of prices.

[19]Note also that in (1904) Gustav Cassel had published, in Swedish, an empirical study of the relationship between gold supplies and the price level that was very much an application of the quantity theory. Perhaps this study also had some influence on the softening of Wicksell's stance on these matters between *Interest and Prices* and the *Lectures*. For a modern and accessible account of Cassel's study, in which his conclusions are explicitly compared to Wicksell's, see Jonung (1979).

[20]And of course, Cassel's (1904) study referred to above (fn. 19) is also in this tradition.

[21]The account is also notably less careful in specifying a set of assumptions that will just render Wicksell's in general incompatible ideas about what constitutes a neutral value for the rate of interest consistent with one another. See fn. 10 above.

[22]And Lars Jonung tells me that in some of his later, unpublished, writings, Wicksell gives the impression of having been, at least on some occasions, a quite unilateral exponent of the Quantity Theory, perhaps under the influence of the experience of the Great War. On this, see Jonung (1988) who, for example quotes from an unpublished (1920) manuscript on "The Effects of the Increase in Interest Rates" as follows: "To search for *any other* cause behind the decline in the value of money than the abnormal size of the volume of notes is unnecessary" (Jonung p. 506, Wicksell's italics).

[23]See fn. 22 above.

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